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October 20, 2010

Mr. Allen Wojtas  
Contract Level Contract Officer's Representative  
U.S. Environmental Protection Agency  
Region 5, LP-9J  
77 W. Jackson Boulevard  
Chicago, Illinois 60604

Reference: EPA Contract No. EP-W-07-074; EPA Task Order No. EP-G10S-00032;  
Sampling and Oversight Support; BASF North Works, Wyandotte, MI; Final  
Sampling and Analysis Plan; Task 01-03 Deliverable

Dear Mr. Wojtas:

Please find enclosed TechLaw's Final Sampling and Analysis Plan (SAP) for collection of pore water samples from the sediments adjacent to the BASF North Works facility located in Wyandotte, Michigan. For your convenience this deliverable was also E-mailed directly to you and Mr. Gary Cygan, EPA Technical Contact (TC) in MS Word format.

Please feel free to contact either me at (312) 345-8974 or Ms. Kim Whitlock at (312) 345-8930 if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads 'Terry Zdon'.

Terry Zdon  
Program Manager

cc: B. Jackson, EPA CO (Email only)  
G. Cygan, EPA Region 5  
J. Thomas, EPA Region 5

B. Smith (Email only)  
TechLaw Chicago Files  
K. Whitlock (Email only)

**FINAL SAMPLING AND ANALYSIS PLAN**

**BASF NORTH WORKS  
WYANDOTTE, MICHIGAN**

**Submitted to:**

**Mr. Allen Wojtas  
Contract Level Contract Officer Representative  
U.S. Environmental Protection Agency  
Region 5, DM-7J  
77 W. Jackson Boulevard  
Chicago, Illinois 60604**

**Submitted by:**

**TechLaw, Inc.  
205 West Wacker Drive  
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Chicago, Illinois 60602**

<b>EPA Contract No.</b>	<b>EP-W-07-074</b>
<b>Task Order No.</b>	<b>EP-G10S-00032</b>
<b>EPA CLCOR</b>	<b>Allen Wojtas</b>
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<b>TechLaw TOM</b>	<b>Kim Whitlock</b>
<b>Telephone No.</b>	<b>(312) 345-8930</b>

**October 20, 2010**

## **FINAL SAMPLING AND ANALYSIS PLAN**

### **BASF NORTH WORKS WYANDOTTE, MICHIGAN**

#### **Introduction**

The following constitutes the Sampling and Analysis Plan (SAP) for the collection of pore water samples at the BASF North Works site located along the shoreline of the Trenton Channel of the Detroit River. The sampling will include field testing and off-site laboratory analysis. The sampling is anticipated to take place for five days beginning on October 25, 2010. This SAP will be used with TechLaw's EPA-approved Region 5 Generic Quality Assurance Project Plan for REPA Sampling Activities, dated October 2007 (Generic QAPP) and TechLaw's Site Specific Health and Safety Plan. Pore water samples for laboratory analysis will be analyzed by the EPA Region 5 Central Regional Laboratory (CRL) in Chicago, Illinois.

#### **Purpose and Objective**

The field activities conducted by TechLaw are intended to provide support to the U.S. EPA by collecting approximately 81 pore water samples for field testing (pH, specific conductivity, and total dissolved solids), of which 20 pore water samples will be submitted for laboratory analysis of metals, chloride, sulfate, and carbonate (determined by analysis of alkalinity). These data will be used to assist EPA in addressing data gaps, better understanding the extent of elevated sediment pH levels along the site, and to evaluate and design potential remedial measures, if necessary. The activities proposed in this SAP are based on the field sampling activities described in Task Order EP-G10S-00032 and clarified in the Technical Direction Memorandum (TDM) received on September 28, 2010, and subsequent discussions with EPA staff.

#### **Background Information**

The BASF North Works property is located at 1609 Biddle Avenue in Wyandotte, Michigan. Presently, a variety of products are manufactured at the site and the property has been utilized for various manufacturing purposes for more than a century. The site encompasses approximately 230 acres along approximately 1.1 miles of the shoreline of the Trenton Channel of the Detroit River. The site shoreline consists of sections of a steel sheet pile bulkhead along the northern portion of the site extending southward; followed by a concrete seawall on a wood-pile wharf, and heavy rip-rap along the southern-most portion. Water depths at the shoreline range from approximately 3.2 feet to 31.5 feet.

Historical contamination consisting of Distillation Blow-Off (DBO) exists both on land and in the approximate 0.5 mile stretch of the Detroit River immediately adjacent to the southern half of the site and extends into the river about 250 feet. Recently, the EPA required BASF to take pH samples from these DBO sediments. However, due to collection and analytical issues, the pH data from this sampling effort are circumspect and cannot definitively be assessed. In 2009, TechLaw collected sediment toxicity samples at upstream reference locations and at

locations adjacent to the BASF facility. The results of the 10-day sediment toxicity tests indicated all eight study area sediment samples represented unacceptable risk to the benthic invertebrate community. Based on these results, EPA plans to investigate the sediment pH further, and collect pore water samples for chemical analysis to evaluate if pH and chemical data correlate with the toxicity results.

### **Sampling Activities**

EPA presented the requested sampling activities in the TDM and clarified the proposed activities during a technical meeting and subsequent discussions following TDM issuance. The proposed sampling activities are discussed below. Figure 1, provided by BASF, depicts the transects adjacent to the facility from which pore water samples will be collected. Figure 2, provided by BASF, depicts the upstream reference locations from which pore water samples will be collected. Refer to Table 1 for the specific sampling locations selected and the rationale for their selection.

Based on the TDM, TechLaw will collect approximately 81 pore water samples at varying depths for field testing. Water quality parameters (i.e., pH, specific conductivity, and total dissolved solids) will be analyzed in the field. Based on discussions with EPA, the sample locations are selected to target the following (in order of priority):

1. sediment toxicity sample locations sampled by TechLaw in 2009 and the corresponding reference sample locations,
2. areas just outside the border for proposed sediment capping,
3. areas where the white DBO material has been observed, and
4. overall distribution of the subject area adjacent to the BASF facility.

In addition to the collection of field parameters, TechLaw will collect 20 pore water samples to be analyzed by a laboratory for metals, chloride, sulfate, and alkalinity. Analysis of alkalinity will be used to determine carbonate concentrations. The 20 pore water sample locations were selected based on the location of the 2009 sediment toxicity locations (i.e., top six inches of sediment), elevated pH levels, and overall distribution of pore water samples. Once the pore water samples are collected, TechLaw will properly label, package, and ship the samples to the CRL in Chicago, Illinois.

For samples collected from approximately 0 to 0.5 feet below ground surface (bgs), a Harpoon sampling device will be utilized. The Harpoon sampler is a new method for obtaining shallow depth pore water samples (Figure 3). It involves the insertion of a small diameter drive tip (0.25-inch outside diameter [OD]) with a 0.5 inch-long sampling screen approximately 15 cm (6 inches) into the riverbed by hand or using a small hammer and a temporary and detachable (0.5-inch inside diameter [ID]) drive rod. Once the tip is inserted, the drive rod is detached and the drive tip is left in place with a 1/16-inch ID, flexible polyethylene sampling tube attached to it along with a 0.25 inch-OD stainless steel retrieval cable. The method has the advantage that the boat need not stay completely still during sampling (depending on the amount of extra tubing attached) and no heavy drive rods are needed or have to be held still in the water column during sampling. The flexible tubing and retrieval cable should allow some small lateral movement of the boat without pulling the sample probe out of the sediments. The Harpoon sampler is the

preferred device for this shallow interval since the water depths may be up to 30 feet deep, and the lines attached to the Harpoon sampler are flexible. The flexible lines allow for more representative samples to be collected since the position of sampling device is less likely to shift around due to currents in the Detroit River.

A peristaltic pump, and sampling manifold will be used to collect water samples. Because of the shallow insertion depth (0.15 m), the total volume of water pumped from the Harpoon Sampler should not exceed 400 milliliters (mL) to avoid pulling overlying surface water into the pore water sample. At greater depths, (i.e., > 0.30 m) larger amounts of water can be pumped (up to several liters); however, the time required to obtain those samples would be prohibitively long due to the small diameter tubing used and slow pumping rate. For the shallow depth samples, flexibility may be required by the laboratory regarding sample volume collected. It will be the intent of the sampling team to obtain the maximum volume available, without pulling in overlying surface water or taking an excessively long time to obtain it. Water from the sampling manifold or from a flow-through cell located on the downstream side of the manifold and its pump, will be analyzed for field parameters (pH, specific conductance, and total dissolved solids). A Thermo Orion model 250A meter will be utilized to collect pH readings and will be calibrated daily prior to use with three calibration standards (pH = 4, 7, and 10). An Oakton CON 10 meter will be utilized to collect conductivity and total dissolved solids measurements and will be calibrated daily prior to use according to the manufacturer's instructions. At selected sites, the team will collect pore water into one unpreserved 250 mL high density polyethylene (HDPE) bottle for chloride, sulfate, and alkalinity analyses and one 200 mL HDPE bottle preserved with nitric acid for analysis of Target Analyte List (TAL) metals. The metals samples will be filtered using a 60 cubic centimeter (cc) plastic syringe with a Luer-Lok tip and 0.45 micron hydrophilic filter prior to collecting into the pre-preserved bottle for metals. However, if field sampling conditions are not optimal and to avoid pulling overlying surface water into the pore water sample, the team will collect 100 mLs for metals analysis and 100 mLs for chloride, sulfate, and alkalinity analyses at a minimum. Due to potential volume constraints, quality control (QC) samples (e.g., matrix spike and duplicates) will be collected from depths greater than one foot using the Waterloo profiler described below.

The small diameter tubing will be back flushed with deionized water (for decontamination) prior to driving the Harpoon sampler probe into the sediments. The tubing will either be replaced or backflushed with deionized water prior to being used at the next sampling site. A visual inspection of the tubing will be performed in between sampling locations and the tubing will be replaced if deemed necessary (e.g., precipitate or excess dirt visible on tubing). In very fine materials (silt size and smaller) the Harpoon sampler may not be able to obtain (pump) sufficient pore water volumes to analyze for field parameters. In very fine deposits, the Harpoon Sampler screen or tubing may completely clog and yield no water. In the event that TechLaw is unable to recover the necessary volume of water for field testing and/or laboratory analysis, EPA will be contacted for an alternative approach.

For pore water samples deeper than 0.5 feet bgs, a Waterloo profiler sampling device will be utilized. The Waterloo profiler is a direct push method that will be used to obtain pore water samples from the sediment of the Detroit River.

The Waterloo Profiler involves driving a 1.25-inch OD sampling port into the subsurface

deposits using a percussion hammer to a depth of one foot (depending on the stability of the boat). The profiler uses stainless steel tubing, a peristaltic pump, and sampling manifold to collect water samples. The sample port can be then driven to greater depths (several feet) to collect deeper samples as necessary. Due to concerns of pulling overlying surface water into the sample water in shallow depths, the Waterloo profiler will be used at depths of one foot or greater. At greater depths, (i.e., > 1 foot) larger amounts of water can be pumped (up to several liters); however, the time required to obtain those samples would be prohibitively long due to the small diameter tubing used and slow pumping rate. It will be the intent of the sample team to obtain the maximum volume available, without pulling in overlying surface water or taking an excessively long time. Water from the sampling manifold or from a flow-through cell located on the downstream side of the manifold and its pump, will be analyzed for field parameters (pH, specific conductance, and total dissolved solids). A Thermo Orion model 250A meter will be utilized to collect pH readings and will be calibrated daily prior to use with three calibration standards (pH = 4, 7, and 10). An Oakton CON 10 meter will be utilized to collect conductivity and total dissolved solids measurements and will be calibrated daily prior to use according to the manufacturer's instructions. At selected sites, the team will collect pore water into one unpreserved 250 mL HDPE bottle for chloride, sulfate, and alkalinity analyses and one 200 mL HDPE bottle preserved with nitric acid for analysis of TAL metals. The metals samples will be filtered using a 60 cubic centimeter (cc) plastic syringe with a Luer-Lok tip and 0.45 micron hydrophilic filter prior to collecting into the pre-preserved bottle for metals. However, if field sampling conditions are not optimal, the team will collect 100 mLs for metals analysis and 100 mLs for chloride, sulfate, and alkalinity analyses at a minimum. Since the Waterloo profiler samples will be collected from a depth of one foot or greater, enough volume should be available for QC samples. Therefore, it is anticipated that QC samples will be collected from deeper intervals (i.e., > 1 foot).

The stainless steel tubing will be back flushed with deionized water prior to and during the driving of the probe to greater depths to prevent the sampling port from clogging and to decontaminate the tubing prior to the next sample being collected. A visual inspection of the tubing will be performed in between sampling locations and the tubing will be replaced if deemed necessary (e.g., precipitate or excess dirt visible on tubing). In very fine materials (silt size and smaller) the Waterloo Profiler may not be able to obtain (pump) sufficient pore water volumes to analyze for field parameters. In very fine deposits, the Waterloo Profiler tubing may completely clog and yield no water. In the event that TechLaw is unable to recover the necessary volume of water for field testing and/or laboratory analysis, EPA will be contacted for an alternative approach.

All samples will be collected using the EPA's Great Lakes National Program Office (GLNPO) R/V Mudpuppy boat, since the locations selected are not wadeable and a flat decked boat is necessary to accommodate the longer lengths of rods utilized. These sampling methods require the boat to stay relatively stationary over the sample point during the entire sampling time so a three anchor system or spuds will be used to position the boat. In water depths greater than 20 ft, productivity of the sampling may be reduced if it is necessary to break and assemble the drive rods between each sampling location. The boat should also be equipped with a winch or crane of sufficient strength to suspend the percussion hammer during the driving of the pipe and be able to pull the drive casing back out of the sediments after sampling is done.

Based on the TDM, TechLaw will ship and/or hand-deliver the pore water samples to the CRL to be analyzed for TAL metals by Method 6010, chloride and sulfate by CRL SOP AIG 045A, and alkalinity by CRL SOP AIG 005. Sample containers, preservatives, and holding time requirements are listed below:

<b>Matrix</b>	<b>Analytical Group</b>	<b>Method</b>	<b>Sample Volume</b>	<b>Containers (number, size, and type)</b>	<b>Preservation Requirements (chemical, temperature, light protected)</b>	<b>Maximum Holding Time (prep/analysis)</b>
Water	Metals	6010	200 mL	One – 200 mL HDPE bottle	Cool to 4°C HNO <sub>3</sub> to pH < 2	6 months
Water	Chloride Sulfate	CRL AIG 045A	250 mL	One – 250 mL HDPE bottle	Cool to 4°C	28 days
Water	Alkalinity	CRL AIG 005	250 mL	One – 250 mL HDPE bottle	Cool to 4°C	14 days

\*Chloride, Sulfate, and Alkalinity samples will be collected into one 250 mL HDPE bottle.

Records of pH readings, additional water quality parameters, and samples collected will be documented in the field log book. Due to the evidentiary nature of samples collected for laboratory analysis, possession must be traceable from the time the samples are collected until their derived data are introduced as evidence in legal proceedings or other uses designated by EPA. To ensure that samples are secure from tampering, chain of custody (COC) documentation will be utilized to provide a traceable record of sample custody for samples submitted for laboratory analysis.

The sampling team members are responsible for the care and custody of the samples collected until they are properly transferred to the shipping company or laboratory. In addition, the sampling team members will ensure that samples are collected, maintained, and transferred in accordance with approved Standard Operating Procedures (SOPs) and COC requirements as follows:

- As few people as possible should handle samples.
- Sample tags/labels will be completed for each sample, using waterproof ink.
- Maintain custody in the field by ensuring the samples are accompanied by the COC documentation and are kept in a cooler that is within the line of sight or in a locked storage location from the time of collection until relinquished by signature and physical custody to the shipper.

Sample Numbering Scheme: The sample numbers will be designated by the Transect number, distance from the shore, and depth of the sample. The following sample ID is an example of how samples will be identified:

T22-50-1.0

T22 = transect location

50 = distance (feet) from shore

1.0 = sampling depth (feet)

Samples only collected for field testing will use the same numbering scheme.

### **Health and Safety**

A Health and Safety Plan (HASP) will be prepared in conjunction with this SAP. The HASP will ensure compliance with OSHA requirements and the health and safety of the field team. Health and Safety considerations will also be taken into account when determining sample locations and equipment. It is assumed that sampling will take place in Level D personal protective equipment (PPE).

### **Investigation Derived Waste Management**

It is assumed that all investigation-derived waste (IDW) generated during sampling (e.g., decontamination water, PPE) will be accepted by the facility for proper disposal.

### **Decontamination**

TechLaw will use disposable sampling equipment and supplies whenever possible, thereby minimizing the need for decontamination. However, for equipment requiring decontamination, the TechLaw Sampling Team will follow procedures outlined in TechLaw's U.S. EPA-approved Generic QAPP and TechLaw's SOPs. In general, sampling equipment requiring decontamination will first be wiped with a paper towel to remove large deposits. The equipment will then be washed in a solution of deionized water (DI water) and Alconox. After washing, the equipment will be triple rinsed with DI water and dried with a paper towel. Decontamination fluids will be containerized as described above.

### **Sample Preparation, Custody and Shipment**

The samples selected for laboratory analysis shall be shipped and/or hand delivered by TechLaw to the CRL, to the attention of the Sample Custodian. Samples cannot be received after 4 pm on any day, nor on weekends or holidays. The Sample Custodian shall be notified by the day the samples are shipped.

Samples will be collected in accordance with TechLaw's EPA-approved Generic QAPP and TechLaw's SOPs, unless otherwise noted in this SAP.

All sample containers will be acquired as certified pre-cleaned containers. As necessary, the outside of the sample containers will be cleaned following sample collection to avoid any potential cross-contamination. Samples will remain in the custody of TechLaw field personnel



until relinquished for shipment to the analytical laboratory. The sample containers will be appropriately labeled (directly on the face of the bottle).

The contact information for the analytical laboratory is as follows:

Region 5 Central Regional Laboratory  
536 South Clark Street  
Chicago, IL 60605  
Telephone: 312-353-9068  
Attn: Robert Snyder (Sample Custodian)

### **Analytical Requirements**

Based on the TDM, the pore water samples shipped and delivered by TechLaw to the EPA Region 5 CRL will subsequently be analyzed as follows:

20 pore water samples for:

- Sulfate by CRL SOP AIG 045A
- Chloride by CRL SOP AIG 045A
- Alkalinity by CRL SOP AIG 005
- TAL metals by Method 6010

### **Quality Control Samples**

During the sampling activities performed by TechLaw, QC samples will be collected in general accordance with TechLaw's EPA-approved Region 5 Generic QAPP. QC samples will include sample duplicates and matrix spike/matrix spike duplicates (MS/MSD). Two duplicate samples and one MS/MSD sample will be collected for this project.

### **Sample Collection and Data Record**

The samples collected by TechLaw will remain in the custody of the TechLaw Sampling Team until relinquished for shipment to the CRL. The samples will be placed in a cooler immediately after collection and will be shipped via FedEx and/or hand-delivered to the laboratory by the TechLaw Sampling Team. The sample containers will be appropriately labeled (label affixed directly on the face of the jar). A COC form will accompany the samples from point of origin to the analytical laboratory. The samples will be collected in the appropriate containers as specified in TechLaw's EPA-approved Region 5 Generic QAPP.

### **Project Schedule and Report Deliverables**

It is anticipated that these sampling activities will be initiated on October 25, 2010 and completed on October 29 2010, depending on the availability of the EPA GLNPO R/V

Mudpuppy boat. Based on the TDM, TechLaw anticipates that the sampling activities will take 5 to 6 days. TechLaw will perform data validation on approximately 25% of the analytical results.

Per the TDM, TechLaw will submit a report 30 days after receipt of all data from the laboratory.

The report will describe all typical field efforts made, including description of sampling techniques used, difficulties encountered in the field, statistical analysis of pH data sets, and data tables of other parameters measured.

### **Project Organization**

Mr. Allen Wojtas is the EPA CLCOR for this project and Mr. Gary Cygan is the EPA Technical Contact (TC). The TechLaw Task Order Manager (TOM) for this TO is Ms. Kim Whitlock. The TechLaw Team Leader, Ms. Kim Whitlock or her designee, will work with other TechLaw personnel to complete the work on the BASF project. The laboratory for this project is the CRL.

# FIGURES



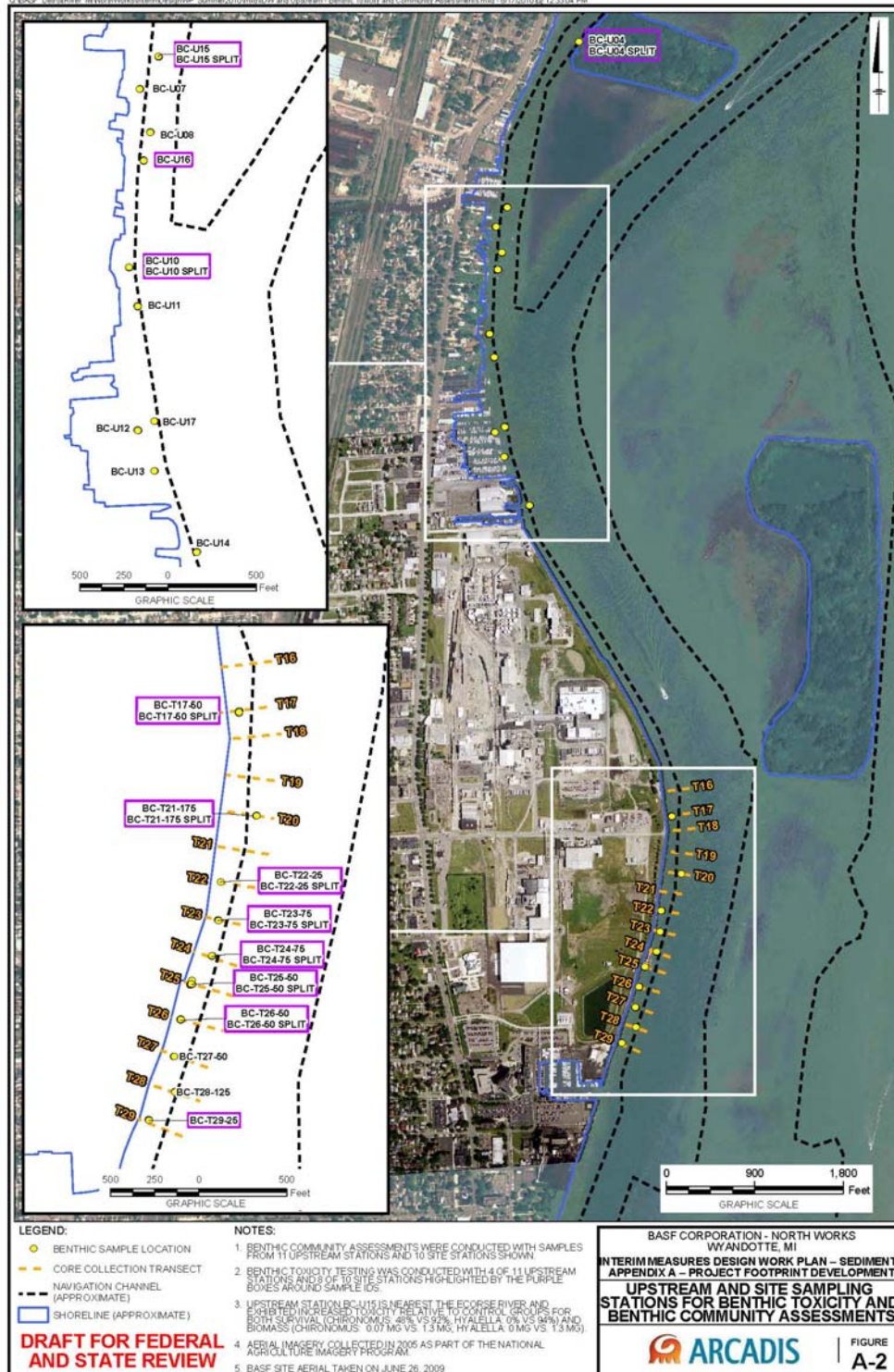
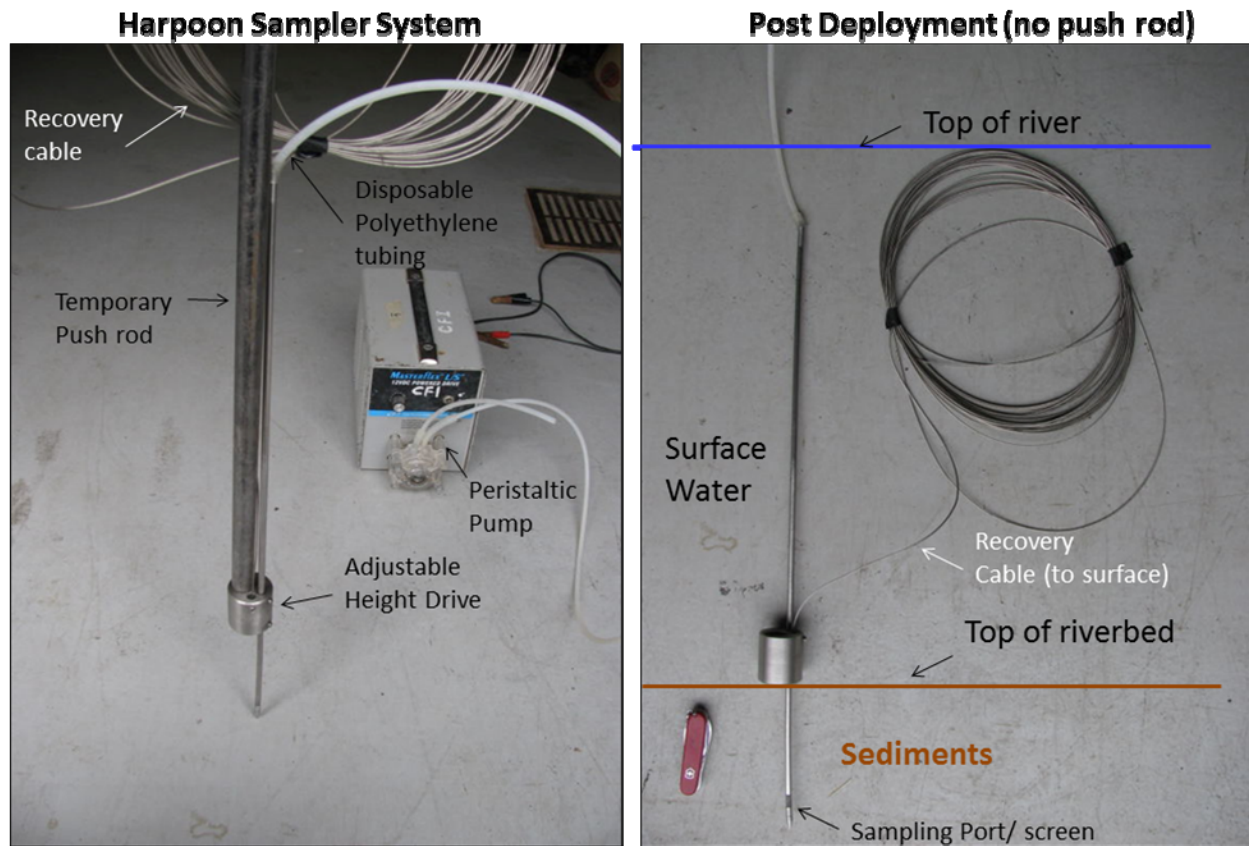


Figure 2 – Locations for Upstream Reference Samples



## HARPOON SAMPLER



**Figure 3 – Photographs of the Harpoon Sampler system and a schematic showing how the sampler would look when deployed.**

# TABLE

Table 1 - Pore Water Sample Locations and Rationale BASF North Works, Wyandotte, Michigan										
Location	Depth (ft bgs)	Laboratory Sample**	pH in 2009	Rationale	Surface Water Depth (ft)	X_DegDM	Y_DegDM	GPS - Northing	GPS - Easting	
T17-50	0-0.5	X	9.08	Sediment toxicity sample collected here in 2009; sediment core recovery was 4 feet	28	-83 8.44524	42 13.0503	263898.4	13455402.8	
	1-2		9.55							
	2-3		9.96							
	3-4		10.35							
T17-100	0-0.5	X	10.08	Outside the area of capping/removal; North of the proposed remedial area; max. pH=10.12; sediment core recovery was 2 feet	31	-83 8.43924	42 13.05258	263912.7	13455429.59	
	1-2		10.12							
T18-25	0-0.5	X	10.41	Very white material observed from 1-3 feet, with pH values exceeding 11	28	-83 8.4519	42 13.02582	263749.27	13455374.71	
	1-2		11.30							
	2-3		11.49							
T18-50	0-0.5	X	11.02	Outside the area of capping/removal; max. pH=11.48; sediment core recovery was 6 feet; white material observed in core with pH values exceeding 11	30	-83 8.44638	42 13.02618	263751.67	13455399.6	
	1-2		11.54							
	2-3		11.43							
	3-4		11.48							
	4-5		10.83							
	5-6		9.66							
T19-125	0-0.5	X	10.91	Light gray/white material observed from 0-2 feet in 2009; pH exceeds 11 from 0.5-1 foot	35	-83 8.43384	42 12.98916	263527.86	13455459.73	
	1-2		10.91							
T20-75	0-0.5		10.80		29	-83 8.451	42 12.9564	263327.74	13455385.03	
	1-2		11.66							
	2-3		11.44							
	3-4		11.52							
	4-5		11.53							
T20-175	0-0.5	X	10.76	Sediment toxicity sample collected here in 2009; sediment core recovery was 2 feet	35	-83 8.42418	42 12.95298	263308.8	13455506.5	
	1-2		10.78							
T21-150	0-0.5		9.26		33	-83 8.44188	42 12.92094	263112.99	13455429.31	
	1-2		10.31							
	2-3									
	3-4		10.94							
	4-5									
	5-6		11.61							
	6-7									
	7-8		10.92							



Table 1 - Pore Water Sample Locations and Rationale BASF North Works, Wyandotte, Michigan										
Location	Depth (ft bgs)	Laboratory Sample**	pH in 2009	Rationale	Surface Water Depth (ft)	X_DegDM	Y_DegDM	GPS - Northing	GPS - Easting	
T22-25	0-0.5	X	11.35	Sediment toxicity sample collected here in 2009; sediment core recovery was 4 feet and pH values were the highest observed at the site	20	-83 8.47062	42 12.89148	262932.3	13455302.2	
	1-2		11.27							
	2-3		12.27							
	3-4	X	12.35							
T23-75	0-0.5	X	11.16	Sediment toxicity sample collected here in 2009; sediment recovery was 4 feet and very high pH values observed in 2009	26	-83 8.47416	42 12.85542	262713	13455289.4	
	1-2		12.28							
	2-3		12.21							
	3-4		12.33							
T24-75	0-0.5	X	9.83	Sediment toxicity sample collected here in 2009; sediment core recovery was 7 feet	26	-83 8.48292	42 12.82176	262508.1	13455252.8	
	1-2		10.92							
	2-3		10.85							
	3-4		10.46							
	4-5		9.75							
	5-6		9.50							
	6-7		8.93							
T25-50*	0-0.5	X	9.40	Sediment toxicity sample collected here in 2009; sediment core recovery was 6 feet in 2008	20	-83 8.508	42 12.79596	262349.7	13455141.8	
	1-2		9.29							
	2-3									
	3-4		9.51							
	4-5									
T26-50*	5-6		10.14	Sediment toxicity sample collected here in 2009; sediment core recovery was 9.5 feet in 2008	19	-83 8.52324	42 12.76242	262145.1	13455076.1	
	0-0.5	X	8.91							
	1-2		9.23							
	2-3									
	3-4		9.79							
	4-5									
	5-6		10.78							
	6-7									
	7-8		10.15							
	8-9									
	9-9.5		9.27							
T27-150	0-0.5		10.90	For spatial distribution purposes, selected this location on this transect based on high pH values observed in 2009	27	-83 8.51784	42 12.72582	261922.89	13455103.74	
	1-2	X	11.71							
	2-3		11.40							
	3-4		10.72							

Table 1 - Pore Water Sample Locations and Rationale BASF North Works, Wyandotte, Michigan									
Location	Depth (ft bgs)	Laboratory Sample**	pH in 2009	Rationale	Surface Water Depth (ft)	X_DegDM	Y_DegDM	GPS - Northing	GPS - Easting
T28-150	0-0.5		9.84	Outside the area of capping/removal; max. pH=10.03; Near the edge of the navigation channel; sediment core recovery was 3 feet					
	1-2	X	9.85		28	-83 8.53152	42 12.69462	261732.48	13455044.77
	2-3		9.52						
T29-25*	0-0.5	X	9.95	Sediment toxicity sample collected here in 2009; sediment core recovery was 5 feet in 2008	10	-83 8.57058	42 12.66906	261574.9	13454870.7
	1-2		<b>11.77</b>						
	2-3								
	3-4		<b>11.84</b>						
T29-100*	0-0.5		9.64	Outside the area of capping/removal; max. pH=10.09; sediment core recovery was 4 feet in 2008	19	-83 8.55636	42 12.66408	261545.6	13454935.3
	1-2		10.09						
	2-3								
	3-4		10.04						
SPI-U04	0-0.5	X		Reference sample collected at this location in 2009 for sediment toxicity; collect pore water samples for background values	12	-83 8.62824	42 14.35866	271832	13454461.3
SPI-U10	0-0.5	X			22	-83 8.8407	42 13.86756	268835.5	13453545.6
SPI-U16	0-0.5	X		Reference sample collected at this location in 2009 for sediment toxicity; collect pore water samples for background values	32	-83 8.81898	42 13.97574	269494.2	13453634.1

**NOTES:**

\* = pH values recorded in 2008; these values were recorded from 0-0.5, 0.5-1, 1-3, 3-5, etc. so pH values were noted in the top foot of each 2 foot interval

\*\* = samples selected will be sent to EPA Region 5 CRL for laboratory analysis

pH readings will be collected from the middle of each interval described above, except for the top interval which will be collected at 0.5 feet

pH values exceeding 11 are bolded

pH values exceeding 12 are bolded and in red text

Due to anticipated time constraints in the field, secondary sample locations have been selected (gray shading) and will be sampled if time allows

GPS coordinates are based on the North American Datum of 1983; coordinates are presented in northing and easting, as well as degree, decimal, minute (X\_DegDM, Y\_DegDM)